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SUGHRUE MION, PLLC  
2100 PENNSYLVANIA AVENUE, N.W.  
WASHINGTON, DC 20037

EXAMINER

PUTTLITZ, KARL J

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1621

DATE MAILED: 09/17/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application N .

09/993,621

Applicant(s)

NAGAR ET AL.

Examiner

Karl J. Puttlitz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 27 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-16 drawn to a production method of a dehydration reaction product classified in class 560 subclass 129+.
- II. Claim 17 drawn to a dehydration reaction apparatus classified in class 422 subclass 129+.

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process can be carried out independent of the claimed apparatus.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

During a telephone election by Joseph Ruch on 9/15/2003 a provisional election was made with traverse to prosecute the invention of Group I claims 1-16. Affirmation of this election must be made by applicant in replying to this Office action. Claim 17 is

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withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 2143.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,265,495 to Hirata et al. (Hirata).

The claims are drawn to a production method of a dehydration reaction product.

The following claims are the rejected independent claims:

1. A production method of a dehydration reaction product which comprises a dehydration reaction step of subjecting a reaction solution containing a polymerizable compound to the dehydration reaction, said dehydration reaction step comprising using a dehydration reaction apparatus, said dehydration reaction apparatus comprising a reaction vessel, a condenser and a connecting pipe joining said reaction vessel with said condenser and satisfying the requirement:  $0.05 < (B_3/A) < 35$  where A is a capacity ( $m^3$ ) of said reaction vessel and B is a total length (m) of said connecting pipe on the horizontal basis.

5. A production method of a dehydration reaction product to be applied to a production of a polymer for cement additives which comprises a dehydration reaction step of using a vertical multitubular heat exchanger in producing the dehydration reaction product from a reaction solution, said vertical multitubular heat exchanger exchanging heat between an extratubular fluid and a distillate from said reaction solution and having a structure comprising a body having an extratubular fluid inlet and an extratubular fluid outlet, covers provided at both upper and lower ends of said body, tubesheets provided in the vicinity of the both upper and lower ends of inside of said body and a plurality of heat exchanger tubes connected between said tubesheets, and no substantial retention areas for said distillate occurring on a connecting site between said tubesheet and said heat exchanger tube.

6. A production method of a dehydration reaction product to be applied to a production of a polymer for cement additives which comprises a dehydration reaction step of using a vertical multitubular heat exchanger in producing the dehydration reaction product from a reaction solution, said vertical multitubular heat exchanger exchanging heat between an extratubular fluid and a distillate from said reaction solution and having a structure comprising a body having an extratubular fluid inlet and an extratubular fluid outlet, covers provided at both upper and lower ends of said body, tubesheets provided in the vicinity of the both upper and lower ends of inside of said body and a plurality of heat exchanger tubes connected between said tubesheets, and no substantial protrusions of said heat exchanger tubes occurring on the surface, with which said distillate comes into contact, of at least a tubesheet provided in the vicinity of the upper end out of said tubesheets.

10. A production method of a dehydration reaction product which comprises a dehydration reaction step of subjecting an alcohol and/or an amine with (meth)acrylic acid to esterification and/or amidation in the presence of a dehydrating solvent, said dehydration reaction step comprising using a reaction vessel and a water separator, said water separator being provided with a feeding pipe connected with said reaction vessel, and having a gaseous phase section and a liquid phase section therewithin, and said feeding pipe having openings in the gaseous phase section and in the liquid phase section.

13. A production method of a dehydration reaction product which comprises a dehydration reaction step of subjecting an alcohol and/or an amine with (meth)acrylic

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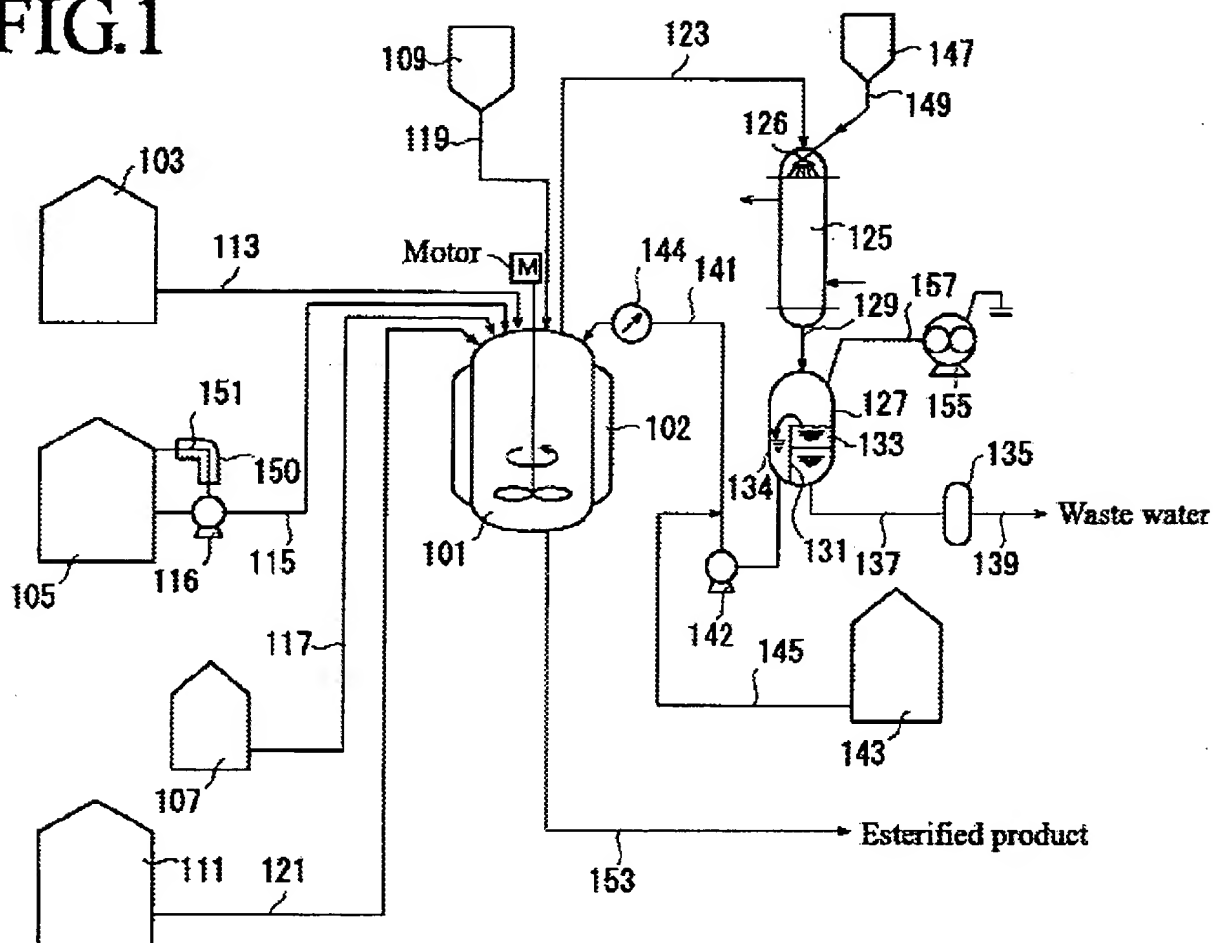
acid to esterification and/or amidation in the presence of a dehydrating solvent, said dehydration reaction step comprising using a reaction vessel and a water separator, and said water separator being provided with a feeding pipe connected with said reaction vessel, having a gaseous phase section and a liquid phase section therewithin, having smaller diameter in a lower portion thereof than a diameter in an upper portion and being so controlled that an interface between the dehydrating solvent and byproduct water is maintained in a lower portion thereof.

14. A production method of a dehydration reaction product which comprises a dehydration reaction step of subjecting an alcohol and/or an amine with (meth)acrylic acid to esterification and/or amidation in the presence of a dehydrating solvent, said dehydration reaction step comprising using a reaction vessel and a water separator, said water separator being provided with a feeding pipe connected with said reaction vessel, having a gaseous phase section and a liquid phase section therewithin and being provided with a detection device of an interface between the dehydrating solvent and byproduct water and/or a gas/liquid interface, and an antigelling agent being caused to act on inside of said detection device.

Hirata teaches a method for the production of an esterified product which comprises esterifying an alcohol with (meth)acrylic acid in a dehydrating solvent in the presence of an acid catalyst and a polymerization inhibitor. See description bridging columns 5 and 6.

Specifically, Hirata discloses an apparatus, as shown in FIG 1:

**FIG. 1**



which is "(an apparatus) for expelling by distillation a distillate containing reaction-forming water to be formed during the esterification reaction in a reaction system (a reaction tank 101), condensing and liquefying the distillate while preventing the occurrence of gel, separating and removing the reaction-forming water, and returning the rest of the distillate at the solvent circulating speed defined above (not less than 0.5 cycle/hour, preferably in the range of 1 to 100 cycles/hour), a circulation system is provided therein for condensing and liquefying by the action of a antigelling agent a distillate occurring as an azeotropic mixture of reaction-forming water and a



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dehydrating solvent, separating and removing the reaction-forming water (water phase) from the condensed and liquefied distillate, and refluxing the rest of the condensate (a solvent phase mainly containing the dehydrating solvent) back to the reaction tank 101 at the solvent circulating speed mentioned above. To be more specific, the upper part of the reaction tank 101 and the top part of the column of a vertical shell and tube type condenser 125 of the counterflow (or parallel flow) contact type are connected with a pipe 123. The lower bottom part of the condenser 125 and the upper part of a water separator 127 made of SUS are connected with a pipe 129. Inside the water separator 127, a partition plate 131 is formed." See paragraph bridging columns 19 and 20.

The difference between the process described in Hirata and the rejected claims is that Hirata requires that the condenser satisfies the requirement:  $0.05 < (B_3/A) < 35$  where A is a capacity ( $m^3$ ) of said reaction vessel and B is a total length (m) of said connecting pipe on the horizontal basis.

However, absent a showing of unexpected results, the requirement that  $0.05 < (B_3/A) < 35$  broadly embraces condensers, and one of ordinary skill would have recognized that the condenser of Hirata necessarily fulfills this requirement. See M.P.E.P. § ("[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)).

In this connection, the examiner invites a showing that Hirata does not embrace the claimed process, i.e., comprises a condenser with the requirement that  $0.05 < (B_3/A)$

<35. See M.P.E. P. § 2112 ([T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 USC 103 on 'prima facie obviousness' under 35 USC 103 jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).").

Accordingly, the rejected claims are *prima facie* obvious in view of Hirata since this reference teaches the elements of the claimed invention with a reasonable expectation of success. See M.P.E.P. § 2143, *supra*.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 989 109 to NIPPON SHOKUBAI CO. LTD. (EP 109).

The rejected claims are given above.

EP 109 also teaches a method for the production of an esterified product which comprises esterifying an alcohol with (meth)acrylic acid in a dehydrating solvent in the presence of an acid catalyst and a polymerization inhibitor. See pages 7-9.

The reference also teaches an apparatus for an esterification reaction in a reaction system, a circulation system is provided therein for condensing and liquefying by the action of an antigelling agent a distillate, and a reaction tank and a tube type condenser connected with a pipe. See Fig 1. and the description at pages 33 and 34.

Again, the difference between the process described in EP 109 and the rejected claims is that EP 109 requires that the condenser satisfies the requirement:  $0.05 < (B_3/A) < 35$  where A is a capacity ( $m^3$ ) of said reaction vessel and B is a total length (m) of said connecting pipe on the horizontal basis.

However, absent a showing of unexpected results, the requirement that  $0.05 < (B_3/A) < 35$  broadly embraces condensers, and one of ordinary skill would have recognized that the condenser of EP 109 necessarily fulfills this requirement. See M.P.E.P. § ("[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)).

In this connection, the examiner invites a showing that EP 109 does not embrace the claimed process, i.e., comprises a condenser with the requirement that  $0.05 < (B_3/A) < 35$ . See M.P.E. P. § 2112 ([T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 USC 103 on '*prima facie* obviousness' under 35 USC 103 jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).").

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Accordingly, the rejected claims are *prima facie* obvious in view of EP 109 since this reference teaches the elements of the claimed invention with a reasonable expectation of success. See M.P.E.P. § 2143, *supra*.

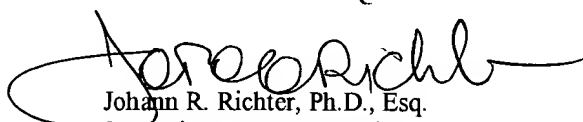
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (703) 306-5821. The examiner can normally be reached on Monday-Friday (alternate).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (703) 308-4532. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1235.

Karl J. Puttlitz  
*Assistant Examiner*



Johann R. Richter, Ph.D., Esq.  
Supervisory Patent Examiner  
Biotechnology and Organic Chemistry  
Art Unit 1621  
703-308-4532

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